

AN INVESTIGATION OF THE SOOTY MOULDS OF NEW SOUTH WALES. V.

THE SPECIES OF THE CHAETOTHYRIEAE.

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(Thirty-nine Text-figures.)

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The members of the subsection Chaetothyriaceae of the family Capnodiaceae are much less conspicuous than those of the Eucapnodiaceae. They never form a thick sooty covering on the leaves of plants. Their mycelium is characteristically very thin and widely effused. The fructifications are scattered irregularly. No fungi belonging to this group have hitherto been recorded for New South Wales, and only one, *Chaetothyrium* (*Meliola*, *Zukalia*) *loganiense* (Sacc.) Th. and Syd., has been recorded for Queensland.

The species here described belong to the genera *Aithaloderma* and *Chaetothyrium*. In referring species to the genus *Chaetothyrium* the writer has followed the emendations of Petrak (1929). Petrak considers that the genera *Chaetothyrium*, *Phaeosaccardinula* and *Treubiomyces*, which are separated by Theissen and Sydow (1917) by the presence or absence of setae and the nature of the septation of the ascospores, are not generically distinct. He points out that intergrading forms between types with setae and those lacking setae may occur in the one species. Boedijn (1931) has come to a similar conclusion.

In Theissen and Sydow's key to the Chaetothyriaceae the differences between the genera *Aithaloderma* and *Chaetothyrium* are given as follows:

Spores 4 to many celled, colourless.

x. Setae present around the ostiole only, mycelium smooth *Aithaloderma*

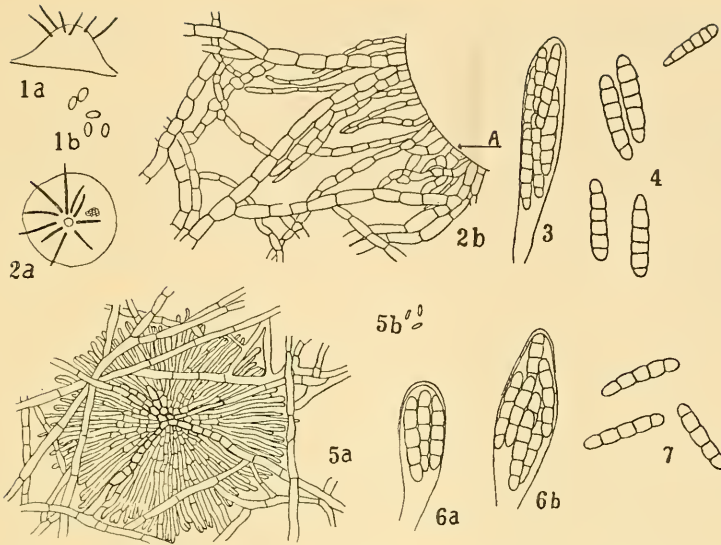
xx. Setae present on the mycelium or perithecium *Chaetothyrium*

Von Hoehnel (1918) has come to the conclusion that the presence of setae round the ostiole in *Aithaloderma* is not necessarily a generic character. He quotes cases in which they are absent altogether from some fructifications and present on others of the same species.

Since, therefore, the presence of setae on mycelium or fructification is not a valid feature for the separation of genera, the key of Theissen and Sydow breaks down. The two genera *Aithaloderma* and *Chaetothyrium* are admittedly distinct, but must therefore be separated on different features.

It is suggested that the following may serve as a basis for separation:

Aithaloderma.—Ascostroma conical, widest at the base, usually about 100 μ in diameter. The wall pseudoparenchymatous. The apical pore often surrounded by divergent dark setae. Asci as numerous as in *Capnodium*. Pycnidium conical, similar to the ascostromata. Mycelium without setae, dark coloured, usually fairly stout. (Various types of pycnidia have been described as belonging to species of *Aithaloderma*, but it is probable that elongated forms such as *Microzyphium* belong to other fungi.)



Text-figs. 1-4.—*Aithaloderma ferruginea*.—1a, Pycnidium, side view, showing setae, $\times 81$; 1b, Pycnidiospores, $\times 425$; 2a, Ascstroma, surface view, showing setae, $\times 81$; 2b, Edge of ascstroma (A) showing radiating hyphae and mycelium, $\times 285$; 3, A single ascus, $\times 425$; 4, Ascospores showing variation in size, $\times 425$.

Text-figs. 5-7.—*Aithaloderma viridis*.—5a, A young pycnidium, surface view, showing radiating hyphae, $\times 81$; 5b, Pycnidiospores, $\times 425$; 6a, 6b, Four- and eight-spored asci, $\times 425$; 7, Ascospores, $\times 425$.

Chaetothyrum.—Ascogenous fructification conical, hemispherical to subglobose, with or without setae. Fructifications typically large, more than 200μ in diameter. The wall of closely interwoven hyphae, may approach the pseudo-parenchymatous condition, but individual hyphae always to be distinguished. Asci very much more numerous than in the preceding. Pycnidia typically lacking. Mycelium slender, typically light coloured.

AITHALODERMA FERRUGINEA L. Fraser.

This species has been described in a previous paper (Fraser, 1935). It is distinguished from *A. clavatispora* Sydow, which it most closely resembles, by the size and colour of the fructifications, the length of the setae, the septation and shape of the ascospores and the size of the pycnidia. Text-figures 1a and 2a show the pycnidium and ascstroma. Asci and ascospores are shown in Text-figures 3 and 4. Text-figure 2b shows the radiating hyphae around the margin of the ascstroma, which are common in this species.

This species is one of the commonest members of the Chaetothyriaceae in New South Wales. It has been found in collections from the following localities: Pennant Hills on *Citrus* sp., 6, 1933, Type, on *Ceratopetalum apetalum* D. Don, 3, 1933, and on *Pittosporum undulatum* Ait., 10, 1933; Tilba Tilba on *Ficus stephanocarpa* Warb., 2, 1933; Salisbury on *Callistemon salignus* DC., 8, 1933; National Park (Sydney district) on *Eugenia Smithii* Poir., 5, 1932; Narrabeen on *Synoum glandulosum* A. Juss., 11, 1933; Pittwater on *Bursaria spinosa* Cav., 5, 1932, on *Breynia oblongifolia* J. Muell., 10, 1934, on *Eugenia Smithii* Poir., 8, 1933; Port Macquarie on *Cryptocarya glaucescens* R. Br., 1, 1934; Glenrock (Newcastle district) on *Elaeodendron australe* Vent., 8, 1933, coll. A. Burges; Mt. Irvine on *Doryphora sassafras* Endl., 9, 1934, coll. J. McLuckie; Twofold Bay

on *Monotoca elliptica* R. Br., 1, 1935; Wiseman's Ferry on *Rapanea variabilis* Mez., 11, 1934; Grafton district on *Bursaria spinosa* Cav., 1, 1935.

AITHALODERMA VIRIDIS L. Fraser.

This species has been described in a previous paper (Fraser, 1935). It is characterized by the radiating structure of the pycnidia (Text-fig. 5a) and ascostromata. The young pycnidia and ascostromata are clear olive-green, the mature fructifications are black, but the radiating border of hyphae is olive-green and stands out conspicuously against the brown mycelium. Four- and eight-spored asci are shown in Text-figure 6, *a* and *b*. Ascospores are shown in Text-figure 7.

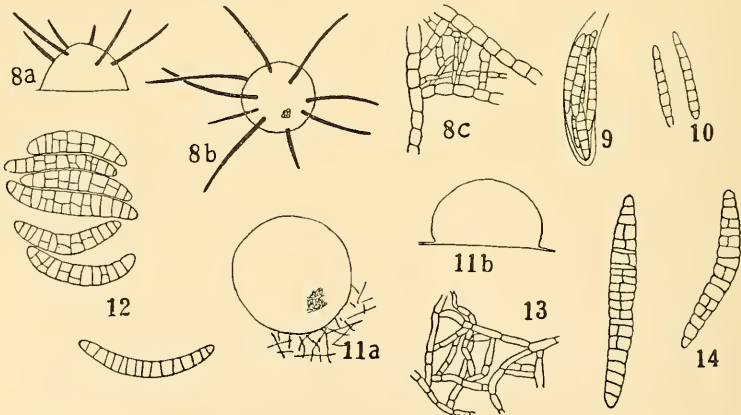
Aithaloderma viridis has been found in collections from the following localities: Glenrock (Newcastle district) on *Elaeodendron australe* Vent., 8, 1933, coll. A. Burges, Type; Pittwater on *Synoum glandulosum* A. Juss., 9, 1934; Grafton on *Pittosporum undulatum* Ait., 1, 1935.

? *CHAETHOTYRIUM LOGANIENSE* (Sacc.) Theiss. and Syd.

The mycelium is light olive-brown, thin, widely effused. The cells are $5 \times 8\text{--}15\mu$, somewhat thinner, lighter-coloured hyphae may form a network between the larger hyphae (Text-fig. 8c). No pycnidia were observed.

The ascogenous fructifications are conical, $75\text{--}150\mu$ in diameter by $50\text{--}70\mu$ high (Text-fig. 8a, 8b). Setae are present around the ostiole but are absent from the lower part of the fructification and the mycelium. The wall is pseudo-parenchymatous, consisting of isodiametrical cells becoming smaller towards the apex. The spines are very dark brown or almost black, opaque, up to 200μ in length, tapering to a rounded point, continuous or one-septate. The asci are oblong-cylindrical $50\text{--}60 \times 10\text{--}12\mu$, eight-spored (Text-fig. 9). The ascospores are hyaline, 6–8-septate, usually $7\text{--}8 \times 3\text{--}4\mu$ (Text-fig. 10).

The fungus agrees well with the description and figures given by Saccardo (1885) for *Meliola loganiense*. Later Saccardo (1891) placed it in a new genus, *Zukalia*. *Zukalia* has been taken as a synonym of *Chaetothyrium* by Theissen and



Text-figs. 8-10.—*Chaetothyrium loganiense*.—8a, 8b, Side and surface views of the ascostroma showing disposition of setae, $\times 55$; 8c, Part of mycelium, $\times 285$; 9, A single ascus, $\times 285$; 10, Ascospores, $\times 285$.

Text-figs. 11-14.—*Chaetothyrium roseosporum*.—11a, 11b, Surface and side views of the fructification, $\times 55$; 12, Ascospores showing variation in septation, $\times 285$; 13, Part of the mycelium, $\times 285$; 14, Ascospores showing large size and degree of septation, $\times 285$.

Sydow (1917). If the specimens examined by the writer are definitely identical with Saccardo's species, it would seem that the affinities of the fungus lie rather with the fungi of the genus *Aithaloderma* from which it appears to differ only in the absence of an apical pore. This feature is variable in the family Capnodiaceae and does not seem adequate for generic separation. Von Hoehnel (1910), who examined the type specimen of *Zukalia loganiense*, could find only unripe fructifications without any setae, and suggested that it should be placed in the genus *Limacinula* (*Phaeosaccardinula*).

This fungus has been found in collections from the following localities: Robertson on *Doryphora sassafras* Endl., 3, 1934; *Aegiceras majus* Gaertn., 5, 1934, coll. A. Burges.

CHAETOTHYRIUM ROSEOSPORUM (von Hoehnel) Petrak.

The mycelium is effused, scanty, the cells are cylindrical, $3-4 \times 7-10\mu$, rather thin-walled, often with somewhat smaller thin-walled hyphae forming a network between the larger cells (Text-fig. 13). The ascogenous fructifications are hemispherical, flattened at the base, $250-300\mu$ in diameter by 150μ in height (Text-fig. 11a, 11b). The wall consists of interwoven hyphae slightly larger than the mycelial hyphae, rather dark brown, becoming smaller and light brown towards the apex where a pore develops at maturity. The mycelium around the base of the fructification is denser than elsewhere, forming a continuous layer of dark-brown interwoven hyphae. This layer is not so conspicuous as in other species of this genus.

The asci and spores are rose-pink in mass. The asci are oblong cylindrical, $60-90 \times 12-15\mu$, eight-spored. The ascospores are hyaline, curved or straight and vary considerably in size and degree of septation in different collections.

In specimens from Macquarie Pass the ascospores were $46-62 \times 9-11\mu$, with 10-15 transverse septa and a number of longitudinal septa. Others were $65 \times 8\mu$, with 15 transverse septa and no longitudinal septa (Text-fig. 12). In specimens from Pittwater the ascospores were 14-22-septate, with additional longitudinal walls, and measured $70-100 \times 5-10\mu$ (Text-fig. 14). In specimens from Salisbury the ascospores were 10-12-septate, without longitudinal walls, and measured $50-60 \times 12\mu$. In specimens from Grafton the spores measure $80-98 \times 10-13\mu$, with 15-22 transverse septa and additional longitudinal ones.

Chaetothyrium roseosporum has been found in collections from the following localities: Macquarie Pass on *Doryphora sassafras* Endl., and *Cryptocarya glaucescens* R. Br., 4, 1934; Salisbury on leaves of unknown plant, 5, 1933; Pittwater on leaves of *Guioa semiglaucula* Radlk., 10, 1934; Grafton on leaves of *Sideroxylon australe* Benth. & Hooker, and *Endiandra Sieberi* Nees, 1, 1935.

CHAETOTHYRIUM FUSISPORUM, n. sp.

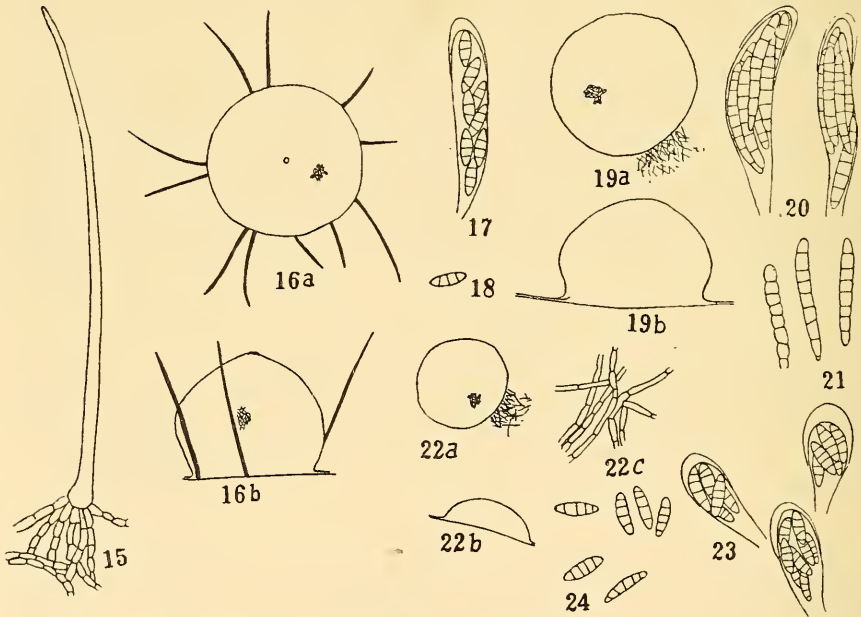
Mycelio effuso, tenuissimo vel conferto. Cellulis cylindricis, ad septa vix constrictis, subfuscis, $4.5 \times 10\mu$. Setis ex mycelio et circa basem ascotronae emergentibus. Setis atris, 3-4-septatis, opacis, $180-240\mu$ longis, ad basem 5μ crassis, ad apicem vix attenuatis.

Fructis ascophoris subglobosis, $150-250 \times 100-150\mu$, muris hypharum contextarum, olivaceo-fuscis. Ascis creberrimis, oblongo-cylindricis, $60-65 \times 10-12\mu$, ad apicem parvis incrassatis, octosporis. Ascosporis ascisque collectis subpunicis. Ascosporis fusoides, hyalinis, 3-septatis, non constrictis, $11-12 \times 3.5-4\mu$.

The mycelium may be thin and effused, or rather dense so as to form an almost continuous network over the surface of the leaf. The cells are slightly constricted at the septa, straw-brown, $10 \times 4.5\mu$; somewhat thinner, paler hyphae may form a network between the larger cells. Setae are present on the mycelium

and around the base of the fructification (Text-fig. 15). The mycelium forms a continuous web around the base of the setae. The setae are dark brownish-black, 3-4-septate, opaque, 180-240 μ in length, 5 μ in diameter at the base, tapering very slightly to the rounded apex. Old spines are frequently covered by a thin layer of hyphal threads. The ascogenous fructifications appear black by reflected light, but when crushed the wall is seen to be composed of olive-green hyphae. The fructifications are subglobose, 150-250 μ in diameter by 100-150 μ in height (Text-fig. 16a, 16b). The wall consists of very closely interwoven hyphae similar to those of the mycelium, becoming smaller towards the apex, which may be slightly papillose, and in which a pore develops at maturity. Setae develop from the mycelium around the base of the fructification but not from the walls. The asci are very numerous, oblong-cylindrical, 60-65 \times 10-12 μ , slightly thickened at the apex, eight-spored (Text-fig. 17). The ascospores and asci are pale-pink in mass. The ascospores are fusiform, hyaline, 3-septate, 11-12 \times 3.5-4 μ (Text-fig. 18). The mycelium is somewhat more dense around the base of the fructifications than elsewhere but does not form a definite subicle.

Chaetothyrium fusisporum has been found in collections from the following localities: Macquarie Pass on *Acacia binervata* DC., 3, 1934, and *Cryptocarya glaucescens* R. Br., 3, 1934; Robertson on *Doryphora sassafras* Endl., 3, 1934; National Park (Sydney district) on *Dodonaea triquetra* Wendl., 6, 1932, *Synoum*



Text-figs. 15-18.—*Chaetothyrium fusisporum*.—15, Seta and mycelium, \times 285; 16a, 16b, Surface and side views of the fructification showing disposition of setae and apical pore, \times 81; 17, An ascus showing thickened apical part of the wall, \times 425; 18, Ascospores, \times 425.

Text-figs. 19-21.—*Chaetothyrium globosum*.—19a, 19b, Surface and side views of the fructification, \times 55; 20, Ascus showing thickened tip, \times 285; 21, Ascospores, \times 285.

Text-figs. 22-24.—*Chaetothyrium griseolum*.—22a, 22b, Surface and side views of the fructification, \times 55; 22c, Part of the mycelium, \times 285; 23, Ascus showing thickened tips, \times 285; 24, Ascospores, \times 285.

glandulosum A. Juss., etc., 6, 1932; Pittwater on *Syncarpia laurifolia* Ten., *Tylophora* sp., and *Smilax glycyphylla* Sm., 9, 1932; Salisbury on *Backhousia myrtifolia* Hook. et Harv., etc., 5, 1933, on *Rhipogonum album* R. Br., on *Pleiococca Wilcoxiana* F.v.M., etc., 5, 1934; Pennant Hills (Sydney district) on *Ceratopetalum apetalum* D. Don, 12, 1933; Bulga (Wingham district) on *Bosistoa euodiformis* F.v.M., 1, 1934; Mt. Irvine on *Doryphora sassafras* Endl., 9, 1934, coll. J. McLuckie; Austinmer on *Endiandra Sieberi* Nees, 10, 1934, coll. J. McLuckie; Comboyne on *Rhipogonum album* R. Br., 1, 1934; Point Clare on *Wilkiea macrophylla* A. DC., 9, 1934, coll. A. Melvaine, Type.

CHAETOTHYRIUM GLOBOSUM, n. sp.

Mycelio tenuissimo, effuso. Cellulis subfuscis, cylindricis, ad septa vix constrictis, $4.5 \times 5-10\mu$

Fructis ascophoris spargentibus, $200-350 \times 190-250\mu$, subglobosis; muris hypharum contextarum, olivaceo-fuscis. Fructis ad basem myceliis confertim contextis circumdatis. Ascis ascosporis collectis subpunicis. Ascis creberrimis, clavatis vel oblongo-cylindricis, $95-100 \times 15-20\mu$, octosporis, ad apicem incrassatis. Ascosporis 6-9-septatis, ad septa vix constrictis, hyalinis, $50-58 \times 5-6\mu$.

The mycelium is sparse, effused, and forms a thin network. The cells are light straw-brown, thin-walled, cylindrical, slightly constricted at the septa, $4.5 \times 5-10\mu$.

The ascogenous fructifications are scattered and appear like small black spots, $200-350\mu$ in diameter by $190-250\mu$ in height (often with a narrow pale brown border) (Text-fig. 19a, 19b). The wall of the fructification consists of interwoven hyphae, olive-brown in colour, becoming smaller and lighter towards the apex where a pore develops at maturity. The fructifications are depressed at the apex when dry and have a conspicuous border, $50-100\mu$ in width, of very closely interwoven hyphae several layers thick, becoming thinner and passing into the ordinary mycelium. According to von Hoehnel the presence or absence of this "subicle" appears to have some importance in the classification of species.

The asci and spores are rose-pink in mass. The asci are very numerous, clavate to oblong-cylindrical, $95-100 \times 15-20\mu$, somewhat thickened at the apex, eight-spored (Text-fig. 20). The ascospores typically have 7, sometimes 6-9 transverse septa, and no longitudinal septa. When mature they are hyaline, slightly constricted at the septa, the two terminal cells more so than the others. The average size is $50-58 \times 5-6\mu$ (Text-fig. 21).

Chaetothyrium globosum has been found in collections from the following localities: Point Clare on *Wilkiea macrophylla* A. DC., 9, 1934, coll. A. Melvaine, Type; Myall Lakes on *Sideroxylon australe* Benth. & Hook., 9, 1934, coll. O. D. Evans.

CHAETOTHYRIUM GRISEOLUM, n. sp.

Mycelio effuso, tenuissimo. Cellulis olivaceo-fuscis, pallidis, $3-3.5 \times 7-10\mu$, cylindricis, ad septa vix constrictis.

Fructis ascophoris plano-hemisphaericis, $200-250 \times 60-120\mu$. Muris hypharum contextarum, glauco-fuscis, pallidis. Fructis ad basem myceliis confertim contextis circumdatis. Ascis creberrimis, clavatis vel oblongo-cylindricis, ad apicem incrassatis, $40-50 \times 15-20\mu$, octosporis. Ascosporis hyalinis, 4-6-septatis, rectis vel curvatis, deorsum attenuatis, $19-25 \times 4-5\mu$.

The mycelium is scanty, effused, consisting of a network of hyphae (Text-fig. 22c). The cells are thin-walled, pale olive-brown, $3-3.5 \times 7-10\mu$, cylindrical, slightly constricted at the septa. The ascogenous fructifications are rather flattened-hemispherical in shape, depressed at the apex when dry (Text-fig. 22a,

22b), 200–250 × 60–120 μ in height. The wall consists of closely interwoven hyphae, pale greyish-brown in colour, and similar in size to the mycelial hyphae, becoming smaller and paler towards the apex where a pore develops at maturity. The fructification is surrounded by a zone of closely interwoven dark brownish-grey hyphae forming a definite border, which grades gradually into the mycelium.

The asci are very numerous, clavate to oblong-cylindrical, thickened at the tip, 40–50 × 15–20 μ , eight-spored (Text-fig. 23). The ascospores are hyaline, 4–5-, occasionally 6-septate, 19–25 × 4–5 μ , straight or slightly curved, often tapering slightly towards the base (Text-fig. 24).

Chaetothyrium griseolum has been found in collections from the following localities: Pittwater on *Syncarpia laurifolia* Ten., 9, 1932; Pittwater on *Dodonaea triquetra* Wendl., Type, *Ficus rubiginosa* Desf., *Synoum glandulosum* A. Juss., and *Ceratopetalum apetalum* D. Don, 10, 1934.

CHAETOTHYRIUM PELTATUM, n. sp.

Mycelio effuso, tenuissimo. Cellulis fumoso-glaucis, cylindricis, ad septa vix constrictis, 3–5 × 6–9 μ .

Fructis ascophoris plano-hemisphaericis, 300–420 × 120–150 μ . Muris hypharum contextarum, fusco- vel caeruleo-glaucis, apici fere pseudoparenchymaticis. Fructis ad basem myceliis confertim contextis, subradiantis, circumdatis, caeruleo-glaucis. Ascis creberrimis, clavatis vel oblongo-cylindricis, apice incrassatis, 55–65 × 13–15 μ , octosporis. Ascosporis hyalinis, 6–9-septatis, rectis vel curvatis, deorsum attenuatis, non-constrictis, 28–32 × 4.5–6.5 μ .

The mycelium is thin and effused. The cells are smoky greyish-brown, cylindrical, slightly constricted at the septa, 3–5 × 6–9 μ (Text-fig. 25c). The fructifications are discoid, rather flattened, 300–420 μ in diameter by 120–150 μ in height (Text-fig. 25a, 25b). The walls consist of interwoven hyphae of a brownish- or bluish-grey colour, becoming almost pseudoparenchymatous towards the apex. A pore develops at the apex at maturity. The fructification is surrounded by a border of closely interwoven rather radiating hyphae of a dark greyish-blue colour which appears to be characteristic of this species. The asci are very numerous, clavate to oblong-cylindrical, thickened at the tip, 55–65 × 13–15 μ , eight-spored (Text-fig. 26). The ascospores are hyaline, 6–9-, usually 7-septate, straight or slightly curved, often tapering to the lower end, usually not constricted at the septa, 28–32 × 4.5–6.5 μ (Text-fig. 27).

Chaetothyrium peltatum has been collected on the leaves of *Eugenia Smithii* Poir., Salisbury, 5, 1934, Type.

CHAETOTHYRIUM FUSCUM, n. sp.

Mycelio effuso, tenuissimo. Cellulis cylindricis, ad septa vix constrictis, fumoso-fuscis, 3.5–4.5 × 7–10 μ .

Fructis ascophoris plano-hemisphaericis, atrofuscis, 200–250 × 75 μ . Muris cellularum isodiametricarum, pseudoparenchymaticis. Ascis creberrimis, angustocylindricis, 50–60 × 10–15 μ , octosporis. Ascosporis hyalinis vel flavidis, pallidis, 3–4-septatis, fusiformis vel deorsum attenuatis, rectis vel curvatis, 16–18 × 4–5 μ .

The mycelium is thin and effused. The cells are cylindrical, slightly constricted at the septa, smoky-brown, 3.5–4.5 × 7–10 μ (Text-fig. 28c).

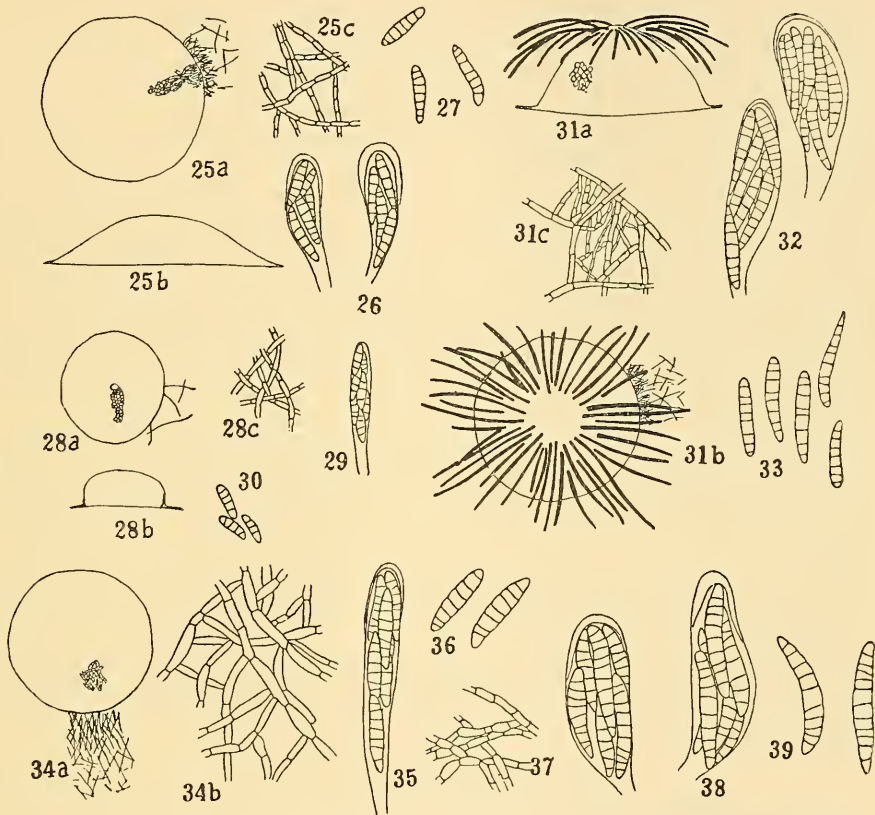
The fructifications are dark-brown, flattened-hemispherical, 200–250 μ in diameter by 75 μ in height (Text-fig. 28a, 28b). The walls consist of dark-brown hyphae, the cells of which are almost isodiametrical, and so closely interwoven as to appear pseudoparenchymatous. The wall cells decrease in size towards the apex where a pore develops at maturity.

There is no concentration of mycelium to form a subicle round the base of the fructification.

The asci are very numerous, narrow cylindrical, $50-60 \times 10-15\mu$, eight-spored (Text-fig. 29). The ascospores are 3-4-septate, hyaline or yellowish, fusiform or tapering slightly towards the base, straight or slightly curved, $16-18 \times 4-5\mu$ (Text-fig. 30).

The fructification resembles that of *Chaetothyrium javanicum*, but the ascospores are much smaller and less septate.

Chaetothyrium fuscum has been found in collections from the following localities: Pittwater on *Syncarpia laurifolia* Ten., 9, 1932, on *Synoum glandulosum*



Text-figs. 25-27.—*Chaetothyrium peltatum*.—25a, 25b, Surface and side views of the fructification, $\times 55$; 25c, Part of the mycelium, $\times 285$; 26, Asci showing thickened tips, $\times 285$; 27, Ascospores, $\times 285$.

Text-figs. 28-30.—*Chaetothyrium fuscum*.—28a, 28b, Surface and side views of the fructification, $\times 55$; 28c, Part of the mycelium, $\times 285$; 29, A single ascus, $\times 285$; 30, Ascospores, $\times 285$.

Text-figs. 31-33.—*Chaetothyrium strigosum*.—31a, 31b, Side and surface views of the fructification, $\times 55$; 31c, Part of the mycelium, $\times 285$; 32, Asci showing thickened tips, $\times 285$; 33, Ascospores, $\times 285$.

Text-figs. 34-36.—*Chaetothyrium cinereum*.—34a, Fructification, surface view, $\times 55$; 34b, Part of the mycelium, $\times 285$; 35, A single ascus, $\times 285$; 36, Ascospores, $\times 285$.

Text-figs. 37-39.—*Chaetothyrium depressum*.—37, Mycelium, $\times 285$; 38, Asci, $\times 285$; 39, Ascospores, $\times 285$.

A. Juss., 10, 1934, Type; Pennant Hills (Sydney district) on *Tristania neriifolia* R. Br., 12, 1933; Salisbury on *Eugenia Smithii* Poir., 5, 1934; Wiseman's Ferry on *Rapanea variabilis* Mez., 11, 1934.

CHAETOTHYRIUM STRIGOSUM, n. sp.

Mycelio effuso, tenuissimo. Cellulis cylindricis, ad septa vix constrictis, fumoso-fuscis, $3\text{--}4.5 \times 7\text{--}10\mu$.

Fructis ascophoris hemisphaericis, $200\text{--}400 \times 150\text{--}200\mu$. Muris hypharum contextarum, atrofuscis. Apice creberrimis setis circumdato. Setis atrofuscis, 1-2-septatis, 300μ longis, apice vix attenuatis. Fructis ad basem myceliis confertim contextis, fuscis. Ascis ascosporisque collectis subpunicis. Ascis creberrimis, clavatis vel oblongo-cylindricis, apici incrassatis, $90\text{--}95 \times 20\text{--}30\mu$, octosporis. Ascosporis hyalinis, rectis vel curvatis, deorsum attenuatis, $32\text{--}46 \times 5\text{--}7\mu$, 7-9- vel 14-15-septatis.

The mycelium is scanty and effused. The hyphae are slender, pale smoky-brown, the cells are cylindrical, slightly constricted at the septa, $3\text{--}4.5 \times 7\text{--}10\mu$, slightly smaller paler hyphae may form a network between these larger threads (Text-fig. 31c).

The fructifications are hemispherical, $200\text{--}400\mu$ in diameter by $150\text{--}200\mu$ in height (Text-fig. 31a, 31b). The walls consist of closely interwoven hyphae similiar to those of the mycelium, or slightly larger, 7μ in diameter, dark brown, becoming smaller and lighter towards the apex where a pore develops at maturity. The apex is surrounded by very numerous setae which grow out from the upper part of the wall of the fructification. These setae are dark smoky-brown, rather irregular in outline, rounded and scarcely attenuated at the apex, usually 1-2-septate, up to 300μ in length. They are characteristically rather reflexed over the sides of the fructification.

The asci and ascospores are pinkish or yellowish-pink in mass. The asci are very numerous, clavate or oblong cylindrical, slightly thickened at the apex, $90\text{--}95 \times 20\text{--}30\mu$, eight-spored (Text-fig. 35). The ascospores are hyaline, curved or straight, slightly tapering towards the base, $32\text{--}46 \times 5\text{--}7\mu$ with 7-9 transverse septa.

In a specimen from Salisbury the ascospores measured $42 \times 7\mu$ but were 14-15-septate. This specimen was otherwise identical with the typical form and is probably only a local variation.

Chaetothyrium strigosum has been found in collections from the following localities: Point Clare on *Wilkiea macrophylla* A. DC., 9, 1934, coll. A. Melvaine, Type; Salisbury on *Eugenia Smithii* Poir., and *Pleiococca Wilcoxiana* F.v.M., 8, 1933.

CHAETOTHYRIUM CINEREUM, n. sp.

Mycelio effuso, tenuissimo. Cellulis subfuscis, cylindricis, ad septa vix constrictis, $3\text{--}4 \times 7\text{--}12\mu$.

Fructis ascophoris plano-hemisphaericis, $300 \times 95\text{--}120\mu$. Muris hypharum contextarum, cellulis prope isodiametricis, subfuscis. Fructis ad basem myceliis confertim contextis, fuscis. Fructis macroscopicis pallidis. Ascis creberrimis, elongato-cylindricis, apici incrassatis, $100\text{--}120 \times 12\text{--}15\mu$, octosporis. Ascosporis fusiformis, vel deorsum attenuatis, 7-septatis, non-constrictis, $35\text{--}42 \times 7\text{--}9\mu$.

The mycelium is scanty and effused. The cells are straw-brown, cylindrical, slightly constricted at the septa (Text-fig. 34b). A network of slightly thinner paler hyphae may develop between the larger ones.

The fructifications are scattered, rather flattened-hemispherical, averaging 300μ in diameter by $95\text{--}120\mu$ in height (Text-fig. 34a). The walls consist of

closely interwoven light brown hyphae, the cells are broad almost isodiametrical, slightly darker than the mycelium, becoming smaller and lighter towards the apex where a pore develops at maturity. The fructifications are surrounded by a zone of closely interwoven hyphae, slightly darker in colour than the mycelium, forming a border round the fructification up to 250μ in diameter, the border is irregular in its development and may be quite small. Macroscopically the fructifications appear pale yellowish-brown.

The asci are very numerous, elongate oblong cylindrical, $100-120 \times 12-15\mu$, slightly thickened at the tip, eight-spored (Text-fig. 35). The ascospores are fusiform or slightly tapering towards the base, 7-septate, not constricted at the septa, $35-42 \times 7-9\mu$ (Text-fig. 36).

Chaetothyrium cinereum has been collected at Pittwater on *Guioa semiglauca* Radlk., Type, and *Backhousia myrtifolia* Hook. & Harv., 10, 1934; Wahroonga (Sydney district) on *Eugenia Smithii* Poir., 10, 1934, coll. J. M. Wilson.

CHAETOTHYRIUM DEPRESSUM, n. sp.

Mycelio effuso, tenuissimo, cellulis subfuscis, cylindricis, ad septa vix constrictis, $5-6 \times 10-15\mu$. Fructis ascophoris hemisphaericis ad apicem depressis, $200-350 \times 100-150\mu$. Fructis ad basem myceliis confertis contextis. Ascis creberrimis, clavatis, apici incrassatis rotundatisque, $90-100 \times 28-30\mu$, octosporis. Ascosporis rectis vel curvatis, fusiformis vel deorsum attenuatis, 9-13-septatis, $48-60 \times 8-10\mu$.

The mycelium is thin and effused, forming a web-like pellicle on the surface of leaves. It consists of a network of interwoven hyphae $5-6\mu$ in diameter, the individual cells being $10-15\mu$ in length, thin-walled, pale yellowish-olive (Text-fig. 37).

The ascogenous fructifications are scattered irregularly, disc-shaped, depressed in the centre when dried, $200-350\mu$ in diameter, $100-150\mu$ in height at the centre. There is a conspicuous border up to 150μ in diameter surrounding the fructification consisting of hyphae similar to the mycelial hyphae, but much more closely woven together, this gradually becomes thinner towards the outer margin, grading almost imperceptibly into the mycelium. The wall of the fructification is composed of closely interwoven hyphae the cells of which are shorter and wider than those of the border and mycelium, becoming smaller towards the apex, where a pore develops at maturity.

The asci are very numerous, clavate, rounded at the apex, $90-100 \times 28-30\mu$, eight-spored, faintly pink in mass (Text-fig. 38).

The ascospores are usually slightly curved, 9-13, usually 10-septate, $48-60 \times 8-10\mu$, tapering slightly towards each end, or slightly wider near the apex and tapering towards the base (Text-fig. 39).

Chaetothyrium depressum has been collected at Grafton on the leaves of *Sideroxylon australe* Benth. and Hooker, 1, 1935.

SUMMARY.

Eight new species belonging to the sub-section Chaetothyriae of the family Capnodiaceae are described.

The relationships of *Chaetothyrium loganiense* are discussed.

Chaetothyrium roseosporum (von Hoehnel) Petrak is recorded for the first time in Australia.

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